BRONCHIAL FOREIGN BODIES RETRIEVAL USING FLEXIBLE FIBREOPTIC BRONCHOSCOPE

Talha Mahmud*, Muhammad Ramzan *, Muhammad Saqib*,
Guness Mal *, Abdul Hafeez*

*Department of Pulmonology, Shaikh Zayed Hospital, FPGMI, Lahore.

Address for correspondence:

Talha Mahmud

Department of Pulmonology, Shaikh Zayed Hospital, Lahore -Pakistan

E-mail: drmtalha@hotmail.com

ABSTRACT

Introduction: Flexible fibreoptic bronchoscopy can be utilized as a useful diagnostic and therapeutic tool to evaluate and extract airway foreign bodies in a variety of situations both in adults and children. Symptoms of foreign body (FB) aspiration are variable depending upon size, type and location of FB in the respiratory tract.

Objectives: Cross sectional study with retrospective analysis of patterns and types of bronchial FBs as well as outcome and safety of their bronchoscopic retrieval during the last 2 years (2015-2017), conducted at the department of pulmonology, Shaikh Zayed Hospital, Federal Postgraduate Medical Institute (FPGMI) Lahore, Pakistan.

Patients & Methods: Twelve patients required bronchial foreign bodies' removal, including 7 males (58%) and 5 females (42%), having ages between 8-80 years (mean age 26.33 years). Procedures were done under topical anesthesia using lignocaine 2% and intravenous midazolam & fentanyl for procedural sedation and analgesia. Symptoms and FB related airway complications were dependent on the duration of FB remaining in the airway; scarf pins aspiration of one day duration was associated with intense anxiety, bronchitis or pneumonia if FB remained in the airway for days to weeks and non resolving pneumonia and lung abscesses if duration of airway FB was in weeks to months.

Results: The 12 FBs which were successfully (100%) removed consisted of plastic material (4 cm in length and 1.8 cm in width), walnut shell (1.4 cm), metallic LED toy light bulb (2.5 cm), four headscarf pins (3.5 cm each), one clothe packing pin (2.5 cm), a thumb pin (2.2 cm), two teeth and a sewing machine needle (3.8 cm). Pins aspiration (scarf pins, sewing machine needle) were more common among females while organic FBs (tooth, plastic material, walnut shell) aspiration was frequently observed among males. The minimal time for removal (bronchoscopy procedure) was for a clothe packing pin (10 minutes) in a 17 year-old-male and maximum time for FB removal was in a 34 year-old–male with walnut shell aspiration requiring 2 bronchoscopic sessions of 3 hours total duration. No major complication (0%) occurred during the interventions and all procedures were successful with none requiring referral for rigid bronchoscopy or bronchotomy.

Conclusion: Flexible fibreoptic bronchoscopy is practically useful and safe for the diagnosis and retrieval of endobronchial foreign bodies.

Key words: Bronchoscopy; Bronchial; Fibreoptic bronchoscopy; Foreign body; Removal

This article may be cited as: Mahmud T, Ramzan M, Saqib M, Mal G, Hafeez A. Bronchial Foreign Bodies Retrieval Using Flexible Fibreoptic Bronchoscope. Pak J Chest Med 2017; 23 (3): 82-92.

INTRODUCTION

Flexible fibreoptic bronchoscopy is useful not only in the diagnosis and treatment of pulmonary diseases, but also in the management of endobronchial foreign bodies. Compared to the pediatric population, the presence of endobronchial FB is relatively rare in adults. [1] Symptoms of FB aspiration usually include severe cough, dyspnea, and wheezing. In a worst case scenario, they can cause death due to suffocation.[1, 2] Adult patients usually notice that they have aspirated FBs, and the diagnosis is then easy. If the patients are not aware that they have aspirated a FB, there may be a misdiagnosis of bronchial asthma or chronic bronchitis or non resolving pneumonia which may lead to bronchoscopy and diagnose the presence of aspirated FB.[1] In patients with long standing endobronchial FBs, complications may include secondary infections, atelectasis & bronchiectasis.[2, 3] Although FB aspiration has been traditionally managed by ENT and thoracic surgeons, the evolution of smaller diameter flexible bronchoscopes has expanded the role for pulmonary physicians in the diagnosis and management of patients with FB aspiration.

PATIENTS & METHODS

A cross-sectional descriptive retrospective study of bronchial FBs removal procedures conducted during last 2 years (2015-2017) in the department of pulmonology, Shaikh Zayed Hospital, FPGMI Lahore. Data of the patients were saved in the computer placed in the procedural suite including age, gender, duration of FB aspiration, type and images of retrieved bronchial FBs, location within the airways, type and radio-density of aspirated FB, duration of procedure for FB removal the route of retrieval (nasal or oral) and any further interventions (table 1). During different stages of the research, ethical considerations were important and all the clinical and radiological details of the patients were kept confidential. Lignocaine 4% was used to spray the nose and throat for local anesthesia; lignocaine gel was used to anesthetize and lubricate the nasal passages during scope insertion and, lignocaine 2% was used to anesthetize the airways during bronchoscope insertion and inspection through the vocal cords to the lower airways. Procedural analgesia & sedation was achieved using midazolam (1-5 mg) +/- fentanyl (25-100 mcg) depending on the tolerance and anxiolysis of the patient. Pulse oximetry was used to monitor heart rate and oxygen saturation (SpO2) during the interventions. Nine patients (75%) had bronchoscope insertion through right or left nostril and per-oral insertion was conducted only in 3 (25%) subjects. Therapeutic (3.2 mm channel) bronchoscope (Fujinon® EB-200 video-bronchoscope system) was utilized and cupped (plain) or alligator (toothed) biopsy forceps were used to grasp the FBs for removal; remaining ancillary equipment (figure 1) was used as per procedural needs e.g. electrocautery use for debulking the granulation tissue surrounding the obstructing FB. After identifying the FB in the airway, suctioning/saline flushing was done to clear any surrounding secretions if needed; biopsy forceps was passed through the working channel of the scope and when it reached the proximal end of the bronchial FB, it was opened and advanced in the forward direction to reach the graspable portion of FB e.g. sharper end of a scarf pin. The exception was the child who aspirated thumb pin, removal was tried after grasping it with the biopsy forceps but due to its very sharp slippery tip, it required passing the FB retrieval basket (figure 1, 4) for successful removal. After grasping the FB firmly, the FB, biopsy forceps and bronchoscope were withdrawn en masse (all removed as one unit) from bronchi, trachea and larynx. In 10 (83%) patients the FBs were taken to the oropharynx and patients were asked to open their mouths; the FBs were then removed from the mouth after grasping with the help of an artery forceps under direct vision through the oral cavity. In two (17%) patients, one (14 year-old-female with scarf pin aspiration) and a female who aspirated a sewing machine needle, bronchoscope and FBs were removed en masse through the respiratory tract and very slowly rotated through nose without any harm to the oro-nasal tract. Post FB removal, bronchoscope was immediately reintroduced to inspect the affected airway and any remaining portion of FB. The secretions in the affected area were cleared through suctioning and if needed, the oozing/bleeding segment of airway was sprayed

Figure 1: Ancillary equipment (of our department) that can be passed through flexible bronchoscope to grip various foreign bodies. From left to right: forceps with grasping claws, alligator forceps, electrocautery forceps, snare forceps, retrieval basket, and cupped hot forceps.

with ice cold saline and epinephrine (1:1000) to help cease bleeding. Images of removed FBs and post procedural chest radiographs were taken and saved in patients' data.

RESULTS

More than 200 diagnostic and therapeutic bronchoscopic procedures were conducted during 2015-2017 and 12 consenting patients required bronchial FBs' retrieval including 7 males (58%) and 5 females (42%). The ages of patients were between 8-80 years (mean age 26.33 years); 66.6% were aged 8-18 years and the remaining three individuals (33.4%) were of 42, 45 and 80 years old. Five (42%) patients were adults and 7 (58%) belonged to pediatric age (<18 years) group with minimal age of 8 and maximum age of 17 years. Ten (83%) patients were aware of the aspiration event while two patients, one (8%) with walnut shell aspiration and the other elderly subject (8%) with tooth aspiration had forgotten about/were unaware of the aspiration events (figure 2). Out of 12 procedures, 11 (92%) were conducted at the interventional bronchoscopy and medical thoracoscopy unit of the department of pulmonology while one (sewing machine needle) extraction procedure was carried out (under fluoroscope guidance) at the department of radiology, Shaikh Zayed Hospital, FPGMI Lahore, Pakistan. In 10 (83%) cases, the objects found their way in right bronchial tree while in 2 (17%) cases the FB (scarf pins) found their way in left bronchial tree. The 12 FBs (figure 3) consisted of portion of a plastic bottle (4 cm in length and 1.8 cm in width), walnut shell (1.4 cm), metallic LED toy light bulb (2.5 cm), four scarf head pins (3.5 cm each), one clothes packing pin (2.5 cm) and a thumb pin (2.2 cm), two teeth and a sewing machine needle (3.8 cm).

Figure 2: Distribution of cases of bronchial foreign body aspirations.

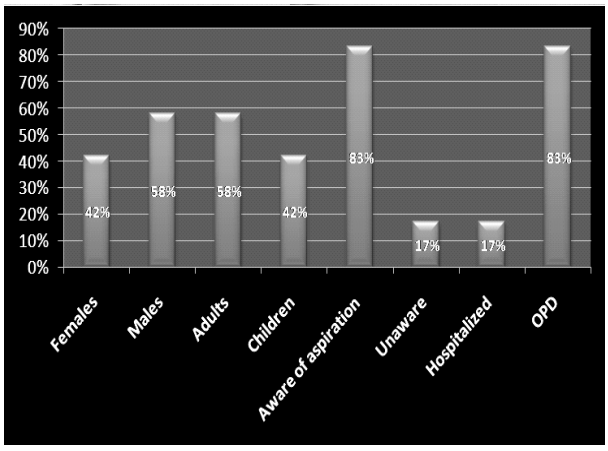
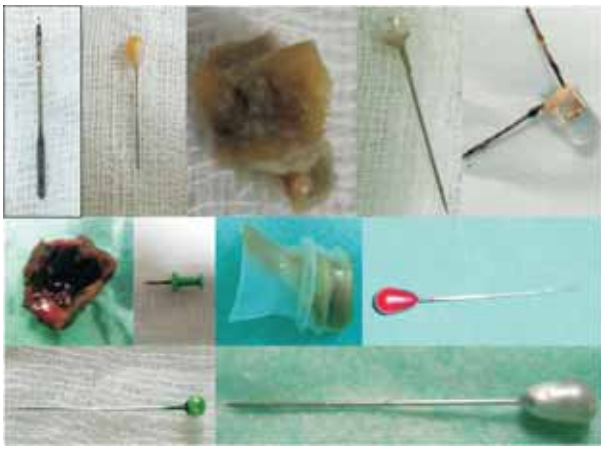


Figure 3: Removed foreign bodies; Top row (left to right): sewing machine needle, scarf pin, tooth, clothes packing pin and LED bulb with wires; middle row (left to right): walnut shell, thumb pin, plastic bottle part, and scarf pin; lower row headscarf pins.



All FBs were radio-opaque (visible on chest radiograph) except plastic FB and walnut shell which revealed some features on HRCT chest suggestive of bronchial obstruction (figure 4) with post obstructive infection (figure 5). It was interesting to note that the plastic heads of headscarf pins, thumb pin, clothe packing pin and the glassy part of LED bulb were not visible on chest radiographs and only sharp metal parts of these objects were actually radio-opaque (figure 6 and 7). The physical inspection within the airway and removal and inspection of these FBs revealed their actual structure (figure 3). The clinical and airway complications of FB aspiration were also dependent on the duration of the FB remaining in the airways. Five females in this study had acute (one day) presentation, 4 with scarf pins aspiration (figure 6) and one with sewing machine needle aspiration (figure 8). All of them were much anxious about the aspiration and the one with sewing machine needle aspiration was more depressed because at time of her presentation in emergency department, she also underwent upper gastrointestinal tract (esophago-gastro-duodenoscopy) in search of the lost needle.[4] The airways of these patients were normal and there were just frothy secretions surrounding the aspirated FBs.

One of the male patients who had 5 days history of clothes packing pin aspiration presented with symptoms of infective bronchitis. Another child who aspirated the thumb pin 2 weeks ago had a pneumonia in right middle lobe (figure 7) and the one who had aspirated the toy LED bulb a month ago had recurrent fever, cough and purulent sputum due to infective bronchitis and middle lobe pneumonia.

Figure 4: (a) HRCT chest showing narrowed right main bronchus (b) plastic FB in RMB (c) epinephrine injection by TBNA needle surrounding the FB (d) alligator biopsy forceps grasping the FB (e) excessive granulation tissue post FB removal causing excessive narrowing of RMB (f) almost patent RMB 2 months after FB retrieval (g) retrieved plastic FB (4×1.8).

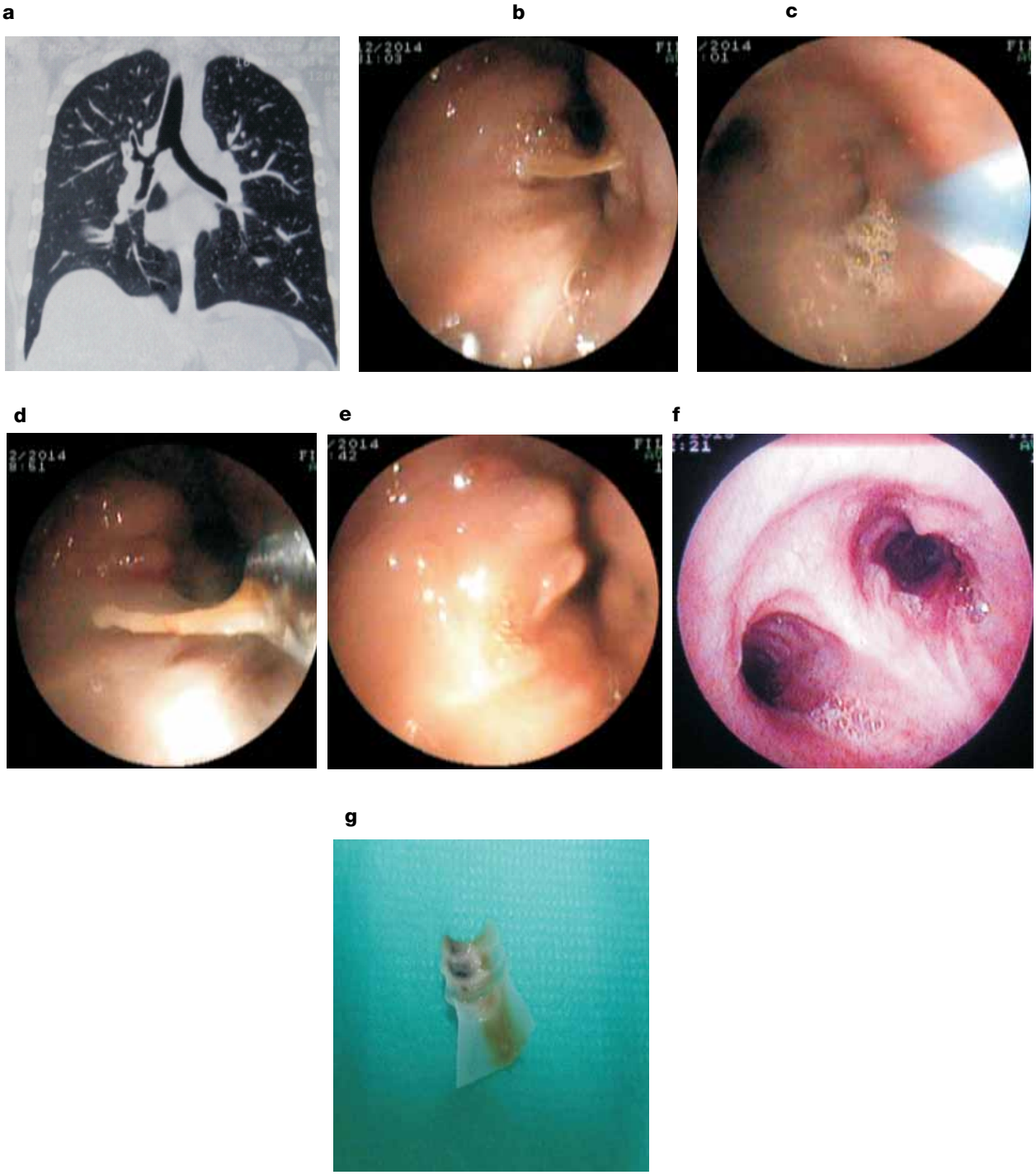


Figure 5: (a) HRCT chest showing calcified semilunar object in bronchus intermedius with post obstructive pneumonia and lung abscess (b) brown walnut shell in bronchus intermedius (c) electrocautery of granulation tissue (d) patent bronchus post procedure.

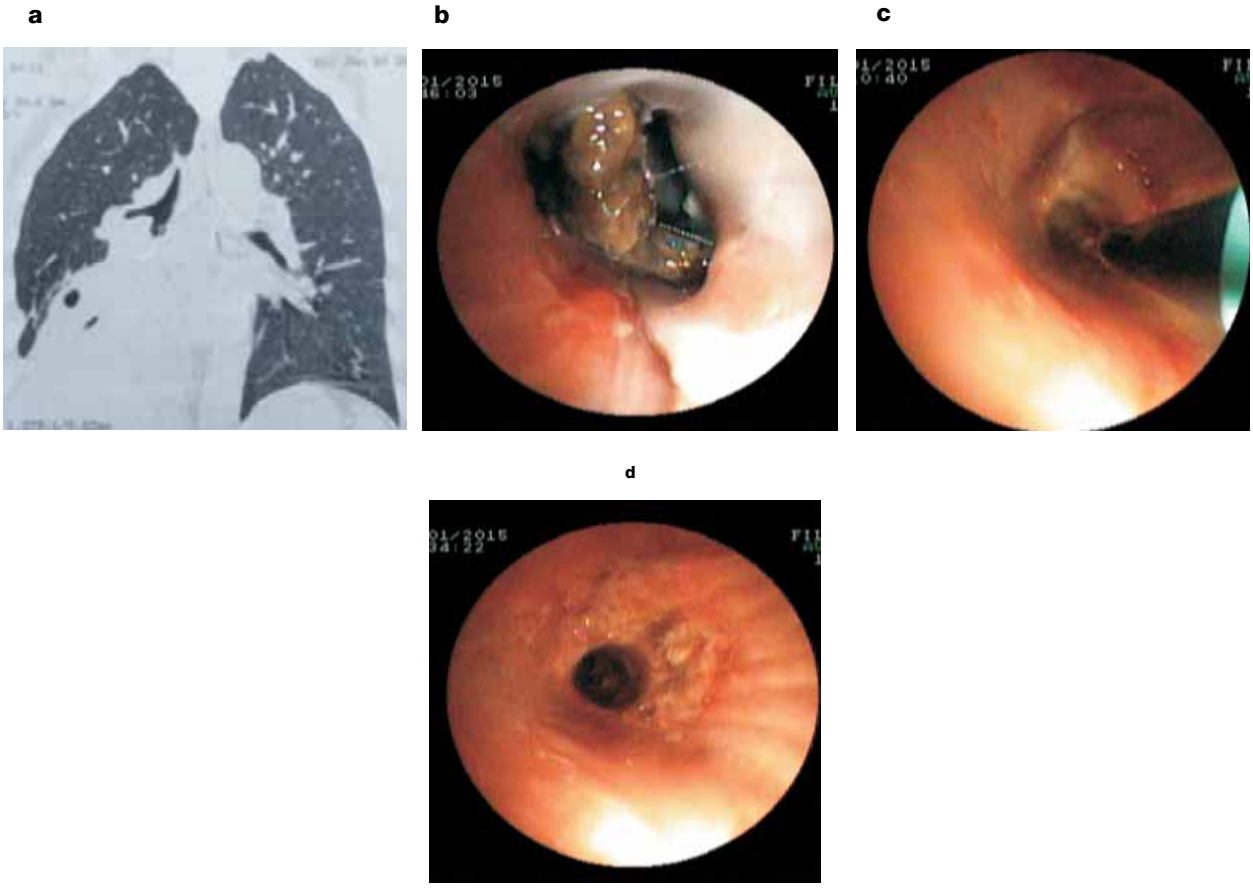


Figure 6: (a) Chest radiograph PA (b) lateral view and (c) bronchoscopic carina, showing scarf pin in left main bronchus.

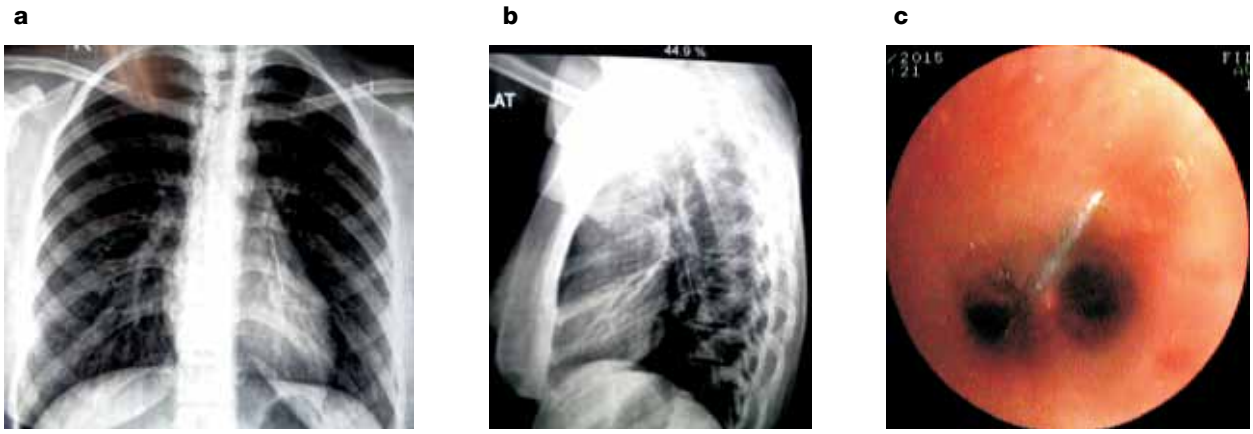
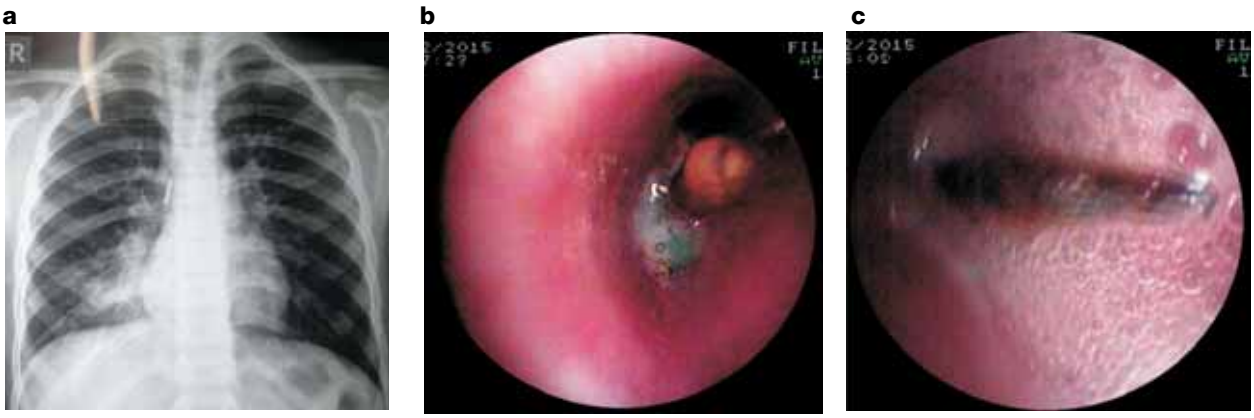


Figure 7: (a) CXR-PA showing thumb pin in RMB and post obstructive pneumonic consolidation in right middle lobe (b) endobronchial FB (green thumb pin) with granulation tissue and (c) thumb pin sharp end with surrounding frothy secretions in RMB.

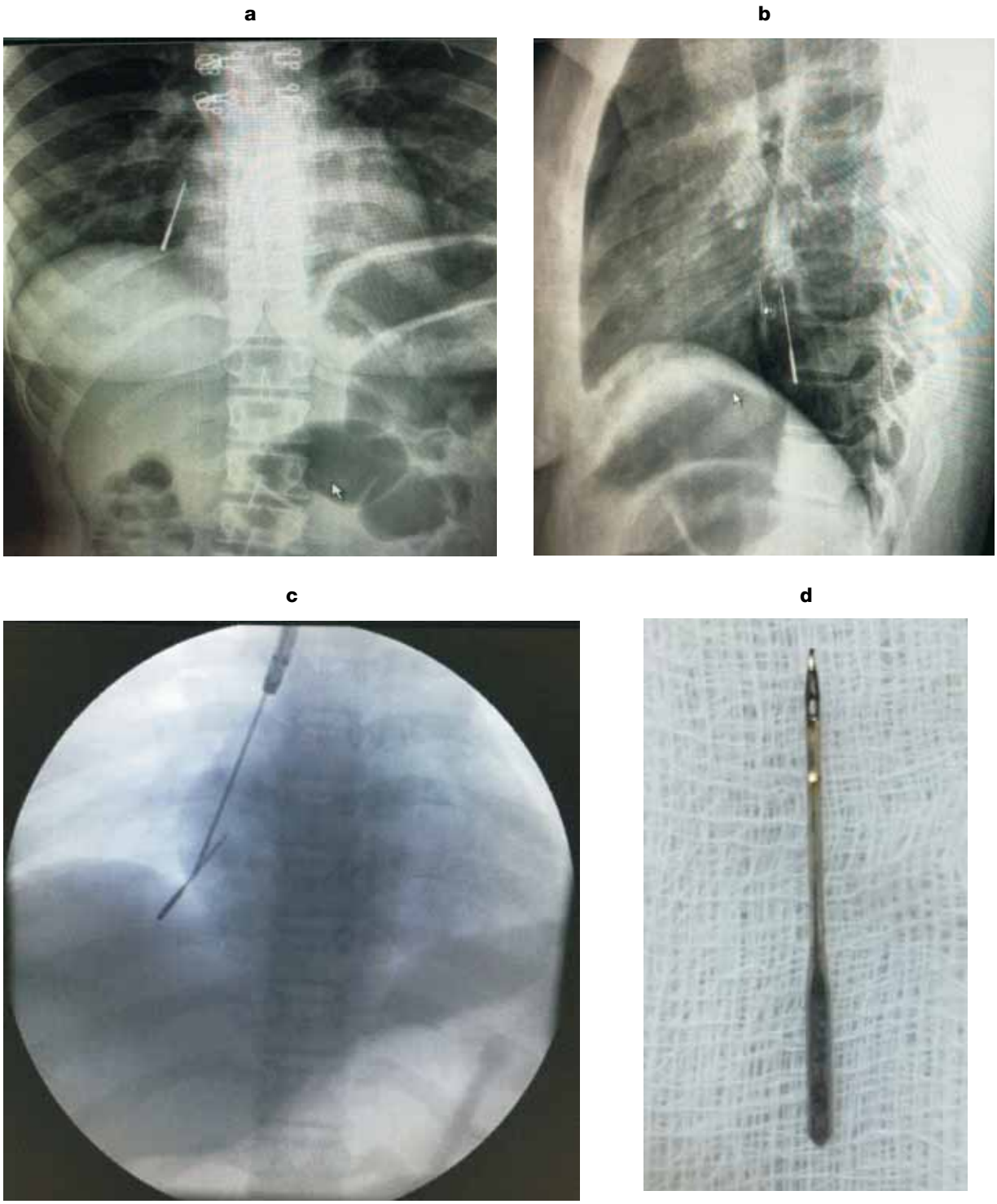


The young man who aspirated a tooth 6 weeks ago presented with lung abscess in right lower lobe. Patient with walnut shell aspiration had a 6 month history of recurrent infections (non resolving pneumonia and lung abscesses) involving right middle and lower lobes (figure 5). Two patients had longest histories of symptoms accompanying pulmonary complications of two years duration. One elderly patient had complete obliteration of his right middle lobe bronchus through which the tooth was removed after breaking calcified debris and granulation tissue around it using biopsy forceps. Remaining right middle lobe bronchial lumen appeared like a slit even after removal of FB. The second patient with the longest history was a 34-year-old male who had witnessed aspiration of a plastic FB (part of a plastic bottle). He visited a number of general and pulmonary physicians and was treated as asthma and recurrent pneumonias. The author advised him bronchoscopy a year ago (before his FB removal) for which he was reluctant and was lost to follow up. During bronchoscopy he was found to have a plastic FB covered by mucus, with surrounding inflamed airway walls and granulation tissue causing >70% narrowing of the airway diameter. Successful removal of FB with the alligator/toothed biopsy forceps was carried out after injecting epinephrine (using TBNA needle) in airway walls surrounding the FB. Follow up bronchoscopy after 2 months showed much reduction in granulation tissue and adequate (>90%) airway patency (figure 4).

The duration of the procedure was variable depending upon patient's cooperation, sedation, coughing and type of FB (most FBs required repeated removal attempts due to grasping-and-slipping-away). The minimal time (10 minutes) was for the 18 year-old-male who aspirated the clothes packing pin, whose sharp end was grasped by the cupped biopsy forceps and was successfully removed in a single attempt. Four female patients with the scarf pins took 15 to 20 minutes for successful removal; removal of the LED light bulb took 20 minutes and removal of the thumb pin required 45 minutes due to repeated grasping and dislodgment during the procedure. The tooth removed from right lower lobe in the young man and plastic FB removal required approximately 30 minutes each. It took one hour to remove the dislodged tooth covered by granulation tissue in the elderly 80 year-old-male. Two (16%) patients required bronchoscopy sessions twice. Female with sewing machine needle aspiration (figure 8) was found to have clear airways during first bronchoscopy, so the second session was carried out under fluoroscope guidance. After repeated attempts of grasping and slipping away, sewing machine needle (3.8 cm) was finally grasped through its sharper end using alligator biopsy forceps and was mobilized by slight to and fro movements followed by its successful retrieval.

The longest duration of the procedure (3 hours) was for the patient with unknown aspiration of a walnut shell. His bronchoscopy was done to visualize the right sided airways in suspicion for an endobronchial abnormality responsible for recurrent post obstructive pneumonia. His bronchus intermedius contained a hard material with extensive inflammation and granulation around it causing complete narrowing of the airway. Electrocautery in combination of biopsy forceps (to debulk the granulation tissue surrounding FB) were used over the involved narrowed bronchus

Figure 8: (a) PA view (b) lateral view chest radiograph showing sewing machine needle in right lower lobe (c) grasping of needle with biopsy forceps through bronchoscope under fluoroscopy (d) retrieved needle (3.8 cm).



achieving partial patency of the involved airway, utilizing two hours of first bronchoscopy session, but the endobronchial hard material could not be removed due to inflammation and granulation around it. Perilesional methylprednisolone (20 mg) was injected and another bronchoscopy session was carried out

Table 1: Characteristics of Bronchial foreign bodies.

Age (Y)	Sex	Aspiration Duration	Complications	FB Type	FB Size (cm)	Location in Airways	Radio Density (CXR)	Removal Route	Procedure duration
34	M	2 years	Asthma like symptoms, recurrent infections (bronchitis & pneumonias)	Plastic bottle part	4× 1.8	Right main bronchus	Lucent	Oral	30 min
42	M	6 months	Lung abscess	Walnut shell	1.4	Bronchus intermedius	Lucent	Oral	3 hours (2 sessions)
80	M	2 years	Atelectasis, recurrent pneumonias	Tooth	1	Right middle lobe bronchus	Opaque	Oral	1 hour
14	M	1 month	Recurrent bronchitis	LED small toy bulb	2.5	Right main bronchus	Opaque	Oral	20 min
17	F	1 day	Anxiety	Scarf pin	3.5	Left lower division	Opaque	Oral	15 min
8	M	2 weeks	Recurrent bronchitis and pneumonia	Thumb pin	2.2	Right main bronchus	Opaque	Oral	45 min
45	M	6 weeks	Right lower lobe atelectasis, pneumonia & lung abscess	Tooth	1.2	Right lower lobe	Opaque	Oral	30 min
18	F	1 day	Anxiety	Sewing machine needle	3.8	Right lower lobe, posterior basal segment	Opaque	Nose	1.5 hours (2 sessions)
17	M	5 days	Bronchitis	Clothe packing pin	2.5	Right main bronchus	Opaque	Nose	10 min
14	F	1 day	Anxiety	Scarf pin	4	Right main bronchus	Opaque	Nose	15 min
13	F	1 day	Anxiety	Scarf pin	3.5	Left main bronchus	Opaque	Oral	20 min
14	F	1 day	Anxiety	Scarf Pin	3.5	Right main bronchus	Opaque	Oral	18 min

after 5 days, during this time the patient was also given systemic corticosteroids to reduce inflammation. During second session of bronchoscopy, the hard walnut shell (figure 5) was retrieved followed by flooding of 300-400 ml of pus through the distal airways (post obstructive pneumonia and abscess), that was suctioned thoroughly.

Patients' discomfort during FB retrieval was dependent on the duration of procedure. All patients experienced anxiety, cough and chest discomfort/pain during the procedure. All procedures were successful (100%) without any major complication and none required referral for rigid bronchoscopy or bronchotomy.

DISCUSSION

FB aspiration is more common in children; according to a US National Safety Council report approximately 80 percent of cases occur in patients younger than 15 years of age, with the remaining 20 percent presenting over the age of 15 years but without gender bias.[1] Generally FB aspiration has low reported rates in adults (0.66 per 100,000) and one retrospective study from a single center reported the removal of 89 foreign bodies in adults over a long period of 20 years.[2] Nail or pin aspiration occurs primarily in young or middle-aged adults during "do-it-yourself" activities; scarf pin aspiration especially occurs in women who hold pins in their mouth to fix their scarfs.[3,4] The type of FB will significantly impact the degree of tissue reaction in the airway with inorganic materials such as metal or glass causing mild tissue inflammation and organic materials, such as nuts and a variety of pills causing significant inflammation and granulation tissue formation, resulting in stenosis of involved airways.[5] In adults, risk factors for FB aspiration include loss of consciousness from trauma, drug or alcohol intoxication or anesthesia. Additional risk factors in elderly individuals include age-related slowing in the swallowing mechanism, medications impairing cough and swallowing and neurologic diseases causing dysphagia, including stroke, Parkinson's or Alzheimer's disease.[6]

Presenting symptoms of FB aspiration depends on the degree of obstruction caused by the FB, as well as the location and duration that the FB remained in the airway.[6] The size and location of the FB also impacts the type of presentation.[5] Aspiration of large FBs that obstruct major airways (oropharynx and trachea) are more likely to present with acute asphyxiation with approximately a third located in the supraglottic position.[5,6] In children, tracheobronchial FB aspiration is often a potentially life-threatening event that may be suspected on the basis of a choking episode. Compared to pediatric population, adults may have subtle or silent clinical presentation of FB aspiration but rarely can present with acute asphyxiation due to large obstructing upper airway FB.[6] Adults typically present with chronic cough due to distal obstruction of the lower airways or there may be symptoms due to complication associated with FB aspiration like pneumonia or lung abscess.[7] More commonly, FBs are aspirated to the lower lobes as was also evident in our study; 10 (83%) out of twelve FBs were found in right side of bronchial tree, the mechanism of which is thought to be due to the more vertical angle and sometimes slightly larger diameter of the right main bronchus relative to the left.[5]

Direct visualization of the FB, usually on bronchoscopy, is required for the definitive diagnosis.[4,6] Gustav Killian (father of modern bronchoscopy) opened the era of bronchoscopy in 1897 when he extracted a pork bone from the trachea of a German farmer using an esophagoscope. Since that time, flexible bronchoscopy became the cornerstone of the diagnostic evaluation in adults and children with suspected FB aspiration.[6] Bronchial obstruction by a FB can result in potentially serious long term complications, including recurrent post-obstructive pneumonia, atelectasis, bronchial stenosis, bronchiectasis, hemoptysis, lung abscess, empyema, pneumothorax, and pneumomediastinum.[5,6] Due to the subtle and chronic presentation of FB aspiration in adults, chest imaging may be more likely to demonstrate the complications of FB aspiration including, post obstructive pneumonia, atelectasis, and, rarely, pneumothorax and unilateral hyperinflation.[5] High index of suspicion in such cases will lead the astute pulmonologist to consider a differential diagnosis of FB aspiration in these situations and consider bronchoscopy. Sensitivity of chest radiography is approximately 70 to 80 percent in children and clinical experience suggests similar poor sensitivity in adults. Metallic FBs are easily recognized due to their particular shapes as was seen in our study e.g. scarf pins, sewing machine needle and LED bulb wires etc. Organic FBs, like plastic FB in one of our patient usually do not show up on plain radiography. CT may be more sensitive but again it cannot easily distinguish organic material in an airway from significant inflammation and post obstructive changes.[8] In our study, all FBs were radio-opaque (visible on chest radiograph) except plastic FB and walnut shell which on HRCT chest had suspicion for narrowing (figure 4) of right main bronchus (plastic FB and surrounding granulation tissue) and some obstructing calcified lesion (walnut shell) in bronchus intermedius (figure 5). A foreign

body may also be discovered incidentally during flexible bronchoscopy performed for symptoms of endobronchial disease, such as chronic cough, hemoptysis, asthma not responding to therapy, or recurrent/nonresolving pneumonia. This was also the case in two of our patients with plastic FB (asthmatic symptoms with recurrent infective exacerbations) and walnut shell (recurrent chest infections).[9]

Rigid bronchoscopy once gold standard for dealing with airways FB aspirations, has given way to less invasive flexible bronchoscopy having success rates of FB extraction in adults ranging from 60 to 90 percent.[10,14] However, rigid bronchoscopy may still be needed for FB retrieval in selected cases. Flexible bronchoscopy is, in general, the diagnostic procedure of choice for non-life-threatening FB aspiration in adults, particularly those with smaller FBs lodged into the lower airways.[5,10] Flexible bronchoscopy allows precise identification and localization of FBs and facilitates the choice of instruments necessary for retrieval (figure 1).

In case of life threatening manifestations when large FBs completely or almost completely obstruct major upper airways (glottis, supraglottis, and trachea), it is crucial to provide adequate oxygenation and secure the patients' airway.[6] Support may include bag valve mask (ambu bag) ventilation and endotracheal intubation. If ventilation is unsuccessful then an emergent cricothyrotomy or tracheotomy may be required if the FB is suspected to be above the vocal cords. Once the airway is secured, immediate inspection of the oropharynx (glottis, supraglottis) is indicated because one third of FB aspiration cases presenting as acute asphyxiation are located in the supraglottis.[7, 10] Removal of the FB using a Magill forceps can be safely performed using direct laryngoscopy, or with smooth or alligator forceps during rigid or flexible bronchoscopy (large central FB of the trachea/main bronchus).[10] In rare cases of cardiac or near cardiac arrest thought to be due to complete obstruction of the trachea (e.g. resistance during bag-mask ventilation in the absence of a supraglottic FB on laryngoscopy), there may be insufficient time to intubate using a rigid bronchoscope and routine endotracheal tube (ETT) placement or cricothyrotomy may not result in adequate ventilation. In such cases, some experts perform intubation using a standard ETT and with the cuff deflated and stylet in place attempt to distally displace a suspected FB into a major bronchus (usually the right) by passing the ETT as far as it can go followed by pulling it back proximally into the trachea and cuff inflation. This maneuver may be life-saving by pushing a tracheal FB to one of the main bronchi so that single lung ventilation may be possible.[11]

In elective non-emergent situations, early diagnostic flexible bronchoscopy is indicated in patients without any symptoms or signs suggestive of acute asphyxiation, especially those with smaller FBs of the lower airway.[12] When performing bronchoscopy in these situations, the unaffected side is examined first. FB retrieval should be performed even in the setting of pneumonia or sepsis as this may help control the infection.[7] Granulations around the airway FBs are not uncommon and have no direct correlation with time the FB remained in airway and may not bleed easily on biopsy or during removal of the FB.[12] In fact, the granulations recede if several pieces are removed, making the FB much easier to recognize and to retrieve in the next bronchoscopy session as was the case in our patient with walnut shell aspiration which became visible only when granulation tissue was removed using endobronchial electrocautery (figure 5). In that patient, second bronchoscopy session was needed after a course of steroids leading to successful retrieval. In our other patient with plastic FB aspiration, most of the granulation tissue regressed within two months and at follow up bronchoscopy, the bronchial lumen was almost fully patent (figure 4). In case of pointed objects being aspirated (pins, needles); the pointed end tends to engage in the mucosa, causing the object to tumble with the point trailing. The bronchoscope is placed into the airway, and, using FB forceps, the pointed end of the object is disengaged from the mucosa, moved distally, and then grasped from the sharp end and removed. In most of our patients with pins aspiration, the pin head provided protection as it got stuck in the major or lobar bronchus preventing its distal dislodgement into the smaller airways. The pointed ends of the pins were also mostly stuck in the airway mucosa with the exception of sewing machine needle that was lost distally and required fluoroscope guidance for its removal from sub-segmental airway (figure 8).[4] After identification of the pins stuck in the airway mucosa, we slightly pushed the object slight distally in the airway to free the sharp pointed end followed by grasping of the pin by the biopsy forceps through the pointed sharp end followed by removal.

Although rigid bronchoscopy is preferred for large, central FBs, flexible fibreoptic bronchoscopy is ideal for cases of distally-wedged FBs beyond the reach of rigid instruments.[5, 9] Occasionally, some cases will need rigid bronchoscopy or a combination of rigid and flexible scopes.[5] In studies done in our population, most of the reported cases were dealt by ENT surgeons utilizing rigid bronchoscopes.[14] The utility of flexible bronchoscopes has expanded the role for pulmonologists in the evaluation and management of adults with FB aspiration. Although we presented only

12 cases in this study, the reported frequency of bronchial FBs in adults is also very low.[2] In rare circumstances, thoracotomy is required for recalcitrant cases.[15] Bronchoscopy should be performed in a room equipped for resuscitation and definitive airway management. Ideally, the bronchoscopist should be equipped with advanced airway tools & rigid bronchoscopy in the unpleasant event of a more serious airway obstruction that may arise during FB retrieval attempts.[7,10,11]

CONCLUSION

Flexible fibreoptic bronchoscopy is useful and quite safe for the diagnosis and removal of endobronchial foreign bodies.

REFERENCES

1. National Safety Council. Report on injuries. Injury Facts. 2011 information online: www. nsc. org / library/report injury usa. htm (Accessed on January 23, 2014).
2. Casalini AG, Majori M, Anghinolfi M, et al. Foreign body aspiration in adults and in children: advantages and consequences of a dedicated protocol in our 30-year experience. J Bronchology Interv Pulmonol 2013; 20:313.
3. Hamad AM, Elmistekawy EM, Ragab SM. Headscarf pin, a sharp foreign body aspiration with particular clinical characteristics. Eur Arch Otorhinolaryngol 2010; 267:1957.
4. Mahmud T, Shafiq A, Hafeez A, Saqib M, Farooq S. Sewing machine needle retrieval from distal airways using flexible bronchoscope under fluoroscopy. Respir Med Case Rep. 2016 12:19 : 132-34.
5. Mehta AC, Khemasuwan D. A foreign body of a different kind: Pill aspiration. Ann Thorac Med 2014; 9:1.
6. Boyd M, Chatterjee A, Chiles C, Chin R Jr. Tracheobronchial foreign body aspiration in adults. South Med J 2009; 102:171.
7. Lan RS. Non-asphyxiating tracheobronchial foreign bodies in adults. Eur Respir J 1994; 7:510.
8. Lund ME. Foreign body removal. In: Principles and Practice of Interventional Pulmonology, 2013. P.477-488.
9. Saliba J, Mijovic T, Daniel S, Nguyen LH, Manoukian J. Asthma: the great imitator in foreign body aspiration? J Otolaryngol Head Neck Surg 2012; 41:200.
10. Chen CH, Lai CL, Tsai TT, et al. Foreign body aspiration into the lower airway in Chinese adults. Chest 1997; 112:129.
11. Walls, Ron M, Murphy, F. Foreign body in the adult airway. In: Manual of Emergency Airway Management, Fourth Ed., Wolters kluwer/ Lippicott Williams and Wilkins, Philadelphia p. 419-423.
12. Lan RS, Lee CH, Chiang YC, Wang WJ. Use of fibreoptic bronchoscopy to retrieve bronchial foreign bodies in adults. Am Rev Respir Dis. 1989;140:1734-7.
13. Shah RK, Patel A, Lander L, Choi SS. Management of foreign bodies obstructing the airway in children. Arch Otolaryngol Head Neck Surg. 2010, 136:373-9.
14. Wahid F, Ullah N, Rehman H, Amin G, Ahmad I. Rigid bronchoscopy for extraction of foreign bodies tracheobroncheal tree: an experience of 232 cases J Postgrad Med Inst 2011;25:152-7.
15. Kim IG, Brummitt WM, Humphry A, Siomra SW, Wallace WB. Foreign body in the airway: a review of 202 cases. Laryngoscope 1973; 83:347.